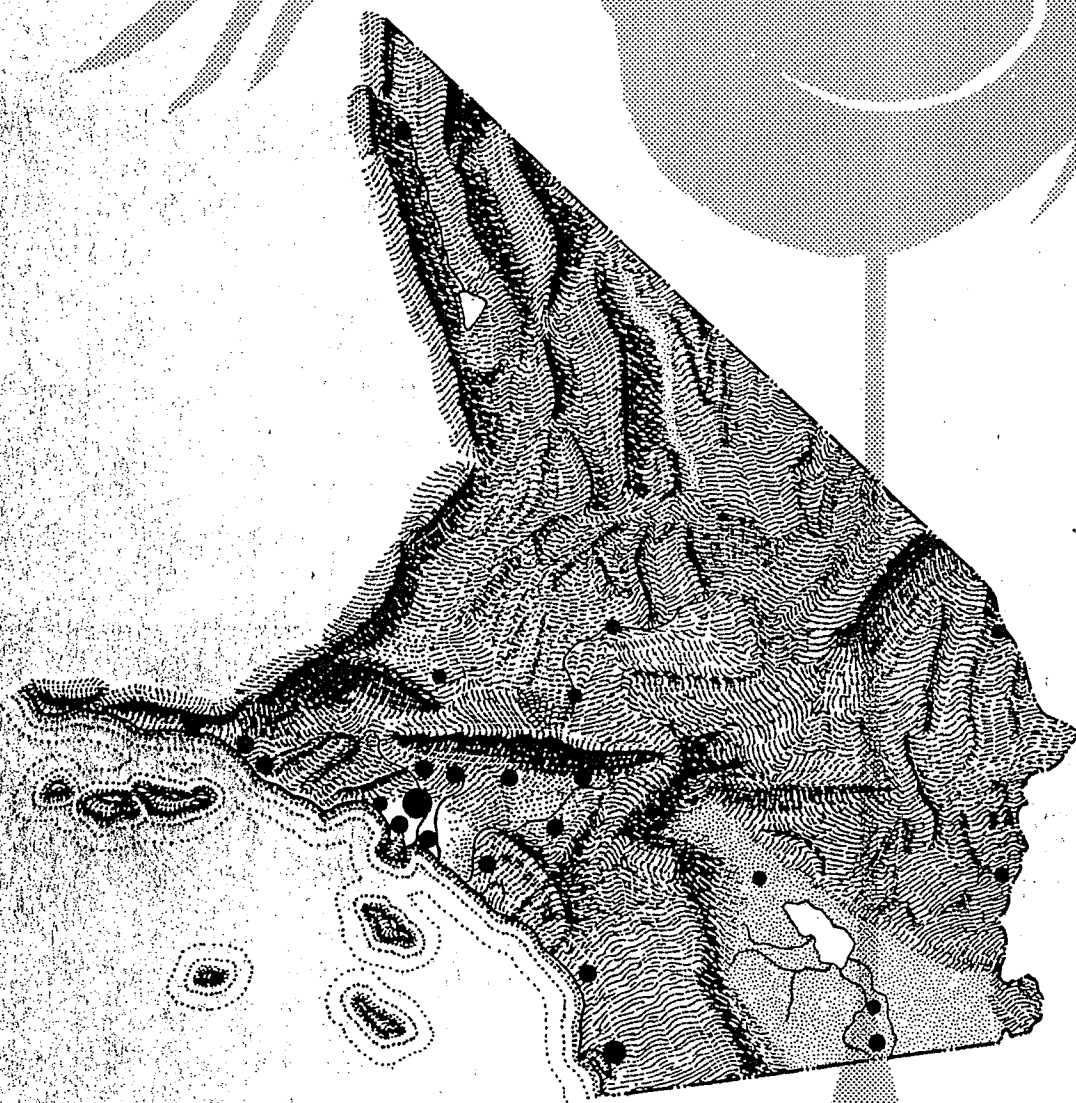


Southland Weather Handbook



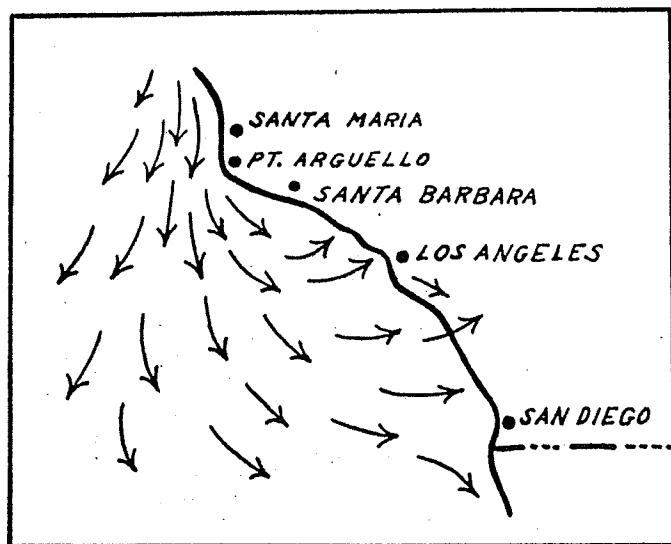
JOHN H. ALDRICH
MYRA MEADOWS

BEST
PUBLICATION

Downwind from these jets we find atmospheric whirlpools (eddies), again like water in a stream. South of each jet the air stream swings in a wide arc toward the land, causing belts where we find strong onshore flow of cool air and fog. Other sections of the coast are protected from the wind and fog to a large extent, causing wide variations of weather along the coast. Areas shielded from wind and fog are found mostly on the south side of land projections, or the north side of bays, where the coastline turns sharply inland toward the east. While flying down the coast one can see these eddies of wind and fog quite clearly in some places. Well-known examples of shielded coastline are Santa Cruz, Santa Barbara, and, to a lesser degree, Long Beach.

The most pronounced jets known on the California coast are near Point Sur, south of Monterey Bay, and near Point Arguello, west of Santa Barbara. Both points often experience northerly wind velocities of 30 to 50 miles per hour during the summer half of the year, and Arguello is known by mariners as a graveyard for ships caught in the blast while rounding the point.

The northerly jet of wind at Point Arguello extends in diminishing force to nearby islands, often as far as San Nicolas Island, and produces the largest of the eddies, embracing the area from Arguello to San Diego. It is known as the "Catalina Eddy" and exerts a great influence on our Southland weather.



Typical Catalina Eddy during late afternoon
of an average summer day

The main onshore flow of sea air fans out from Santa Monica to below San Diego, reaching the coast from west-southwest in Santa Monica Bay and from west-northwest in San Diego County. Islands and hills cause minor variations in the larger pattern, such as the deflecting influence of the Palos Verde Hills. On the coast northwest of Santa Monica to Santa Barbara the sea air reaches the coast from a more southerly quarter. At Santa Barbara the sea breeze is from southwest, but usually becomes easterly after dark, due to the Catalina Eddy, causing fog to arrive late or not at all.

The sea breeze moves inland over coastal valleys and up the mountain slopes by devious routes, causing a wide variation of temperature and moisture with elevation, varying also with distance inland from the coast. Here terrain plays a major role again, since distance from the coast should be measured by the path of the sea breeze rather than direct airline distance. Long Beach, for example, has a late afternoon sea breeze from north of the Palos Verde Hills, and the air is thus warmed by passing over 8 or 10 miles of land, even though Long Beach is adjacent to the ocean on the south. This quirk of wind flow may also affect Santa Ana, where daytime temperatures compare with those of Burbank, although Santa Ana is much closer to the coast.

Rainfall distribution is influenced heavily by a combination of wind direction and topography. Moisture-bearing winds from the ocean move up the mountain slopes, where forced lifting extracts the moisture from rising air currents. Two principles of physics mentioned earlier will help to explain why. First "expansional cooling" of air as it rises and becomes thinner. Higher altitude means the air weighs less, therefore it expands and becomes cooler. Second, since warm air can hold more moisture than cool air, the cooling process squeezes out the excess moisture that was held by the warmer air at lower elevations. This will help to explain why showers are heavier and more numerous near the mountains than on the coast. The accompanying rainfall chart (Geographical Distribution of Precipitation) shows how rainfall distribution is affected by topography.

Just as the lifting process removes excess moisture, the descending air on the lee side of the range causes warming and drying — warming by compression of heavier air at lower elevations, and drying because the warmer air evaporates some of the moisture. Hence the desert receives much smaller amounts of rainfall, and the weaker storms pass eastward without yielding any measurable amounts of rain over the desert.

The rugged mountain terrain plays another important role with winds from other directions. Winds blowing across the ridges and through the passes have many varied effects, depending on the prevailing direction, stability of the air, strength of the storm and other factors. Desert winds moving down coastal slopes are warmed by compression at lower elevations, bringing clear, dry weather to coastal sections.

Thus we can see that the relation between ocean, valleys, mountains and desert is quite complex, and the role of topography is all-important to our Southland weather. Summarizing a few physical laws that have much to do with our weather:

Warm air is lighter in weight than cool air.

Warm air holds more water vapor than cool air.

Warm air cools from expansion as it rises or is lifted up mountain slopes.

Cool air is warmed by compression as it descends mountain slopes.



Ventura County
Air Pollution
Control District

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Richard M. Baldwin
Air Pollution Control Officer

December 1, 1994

David P. Howekamp, Director (A-1)
Air & Toxics Division
EPA Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Regarding: San Nicolas and Anacapa Islands Attainment Classification

Dear Dave:

I am requesting that your office clarify the attainment classification status of San Nicolas and Anacapa Islands. This issue will be confronting you when you begin to review the Ventura County 1994 AQMP. In the adopted plan, the Air Pollution Control Board specifically exempted San Nicolas Island from requirements in the Plan, subject to a formal determination from EPA that San Nicolas Island is not part of the Ventura County federal ozone nonattainment area.

In the November 6, 1991 federal register, page 56731, EPA designated, for ozone, that all of Ventura County is the Ventura County nonattainment area, and that this area is Severe 15 for ozone. On page 56732, EPA designated the South Central Coast (remainder of), Channel Islands, as unclassifiable/attainment.

For your information, San Nicolas Island and Anacapa Island are part of Ventura County, and are also part of the Channel Islands. Enclosed is a copy of the relevant sections of the California Government Code that identifies the boundaries of counties in California, and specifically identifies the boundary of Ventura County. Also enclosed is Health and Safety Code Section 40002 establishing the district within the entire county.

In the federal register notice, where a nonattainment area boundary is less than a whole county, EPA specifically explains why the boundary is less than the county. In the case of Ventura County, no explanation of a lesser area was described on page 56731. The presumption then is that EPA meant to include all of Ventura County in the Ventura nonattainment area, and that is the definition we have been using since November 6, 1991.

The possibility of a conflict in federal regulations was brought to our attention on September 14, 1994, when the Navy submitted to us a copy of a July 8, 1994 memorandum from Dave Jenson of your staff addressed to "Interested FIP Staff." In

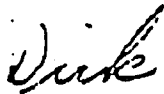
14:46 0805 095 1999 VENTURA CO APCD EPA REG 9, 19th 0805/00

this memo Dave states "The Ventura County ozone nonattainment area comprises all of Ventura County except for the Channel Islands, which are an unclassifiable/attainment portion of the South Central Coast Air Basin . . .". This was the first time I was made aware of the possibility of an internal conflict in EPA's designation of the Ventura County ozone nonattainment area. Unfortunately this issue was not discussed with my staff before the memo was released.

Since the Code of Federal Regulations specifies that all of Ventura County is nonattainment for ozone, and also specifies that San Nicolas and Anacapa Islands are unclassifiable/attainment, there is a conflict in federal regulations which we (Ventura) cannot resolve.

I would appreciate your providing to me formal determination of the correct boundary for the Ventura County federal ozone nonattainment area.

Sincerely,



Richard H. Baldwin
Air Pollution Control Officer

cc: James W. Thonis, Assistant County Counsel
Bill Mount, APCD
Scott Johnson, APCD
James D. Boyd, Executive Officer, ARB
Ron Dow, U.S. Navy, Point Mugu

***MINOR NEW SOURCE REVIEW
CONSTRUCTION PERMIT APPLICATION***

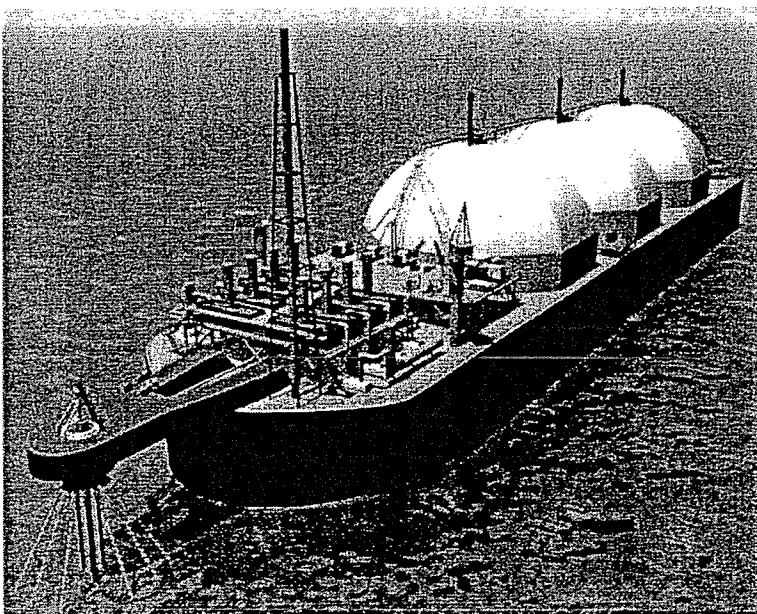
Cabrillo Port

Deepwater Port in the Vicinity of Ventura, California

Submitted to:
**United States Environmental Protection Agency
Region IX – Air Division**



Submitted by:
BHP Billiton LNG International Inc.



December 2005

Application	Specification number	Date	Revision	
Offshore	00470507-S504	1.12.2005	1	QTY

4. SELECTIVE CATALYTIC REDUCTION UNIT

A selective catalytic reduction unit can be installed to reduce the NO_x and VOC emissions. The SCR is installed prior to waste heat recovery units. The urea is injected 3 – 5 meters prior to the SCR unit to ensure proper mixing of urea and exhaust gas. The unit is optimised to reduce emissions in gas mode.

4.1 EMISSION LEVELS

The emission reduction equipment is designed to meet exhaust gas emissions below. The fuel specifications have a significant impact on the emissions levels. The emission levels below are only valid for the fuel specified in chapter 2.1.2. The sulphur content in the liquid fuel will highly determine the SO_x emissions, which can only be specified after the final diesel specification has been reviewed.

4.1.1.1 In gas mode ¹⁾:

NO _x	9 ppmv, dry at 15% O ₂
CO	20 ppmv, dry at 15% O ₂
VOC	40 ppmv, dry at 15% O ₂
PM _{10, dry}	10 mg/m ³ dry at 15% O ₂

4.1.1.2 In diesel mode ¹⁾:

NO _x	150 ppmv, dry at 15% O ₂
CO	25 ppmv, dry at 15% O ₂
VOC	60 ppmv, dry at 15% O ₂
PM _{10, dry}	21 mg/m ³ dry at 15% O ₂

¹⁾ Values at 90% load, not valid at other loads!

4.1.1.3 Applicable measurement methods for emissions:

NO _x	USA EPA Method 7E: Determination of nitrogen oxides from stationary sources (instrumental analyzer method).
VOC	USA EPA Method 18: Measurement of gaseous organic compound emissions by gas chromatography. VOC is defined as Non Methane Non Ethane Hydrocarbons. Measured components are C ₃ H ₈ , C ₄ H ₁₀ , C ₅ H ₁₂ , C ₆ H ₁₄ , C ₂ H ₄ , C ₃ H ₆ , C ₄ H ₈ , C ₅ H ₁₀ and C ₆ H ₁₂ . Formaldehyde concentration is negligible after a catalyst. If required this can be verified with method CTM-037.
PM _{10, dry}	USA EPA Method 17: Determination of particulate emissions from stationary sources (in-stack method)
CO	USA EPA Method 10 : Determination of carbon monoxide emissions from stationary sources.

Measurement uncertainties to be evaluated by the party that carries out the measurement. The assessment of the guarantee fulfilment to be performed according to Section 6.2 of the VDI 2048 guidelines.